11:19:29 OCA PAD AMENDMENT - PROJECT HEADER INFORMATION 12/02/94

Active

Project #: B-13-604 Cost share #: Rev #: 2
Center # : 10/24-6-Q6323-0A0 Center shr #: OCA file #:
Work type : RES
Contract#: GETC95.301-GIT Mod #: ADMIN. Document : SUBCONT
Prime #: GETC95.301 Contract entity: GIT

Subprojects ? : N CFDA: NA
Main project #: PE #: NA

Project unit: EOEML Unit code: 01.021.740
Project director(s):
BAYER C W EOEML (404)894-3825

Sponsor/division names: UNIVERSITY OF GEORGIA / ATHENS, GA
Sponsor/division codes: 400 / 009

Award period: 940701 to 950630 (performance) 950630 (reports)

Sponsor amount	New this change	Total to date
Contract value	0.00	469,154.00
Funded	0.00	469,154.00
Cost sharing amount		0.00

Does subcontracting plan apply ?: N

Title: INDOOR AIR QUALITY, GETC 95-301 - GIT

PROJECT ADMINISTRATION DATA

OCA contact: Ina R. Lashley 894-4820

Sponsor technical contact

MARY G. BROWN
(706)542-8855

GETC, DRIFTMIER ENGINEERING CENTER
THE UNIVERSITY OF GEORGIA
ATHENS, GA 30602

Sponsor issuing office

LINDA ALLEN
(706)542-

DIRECTOR, SPONSORED PROGRAMS
THE UNIVERSITY OF GEORGIA
BOYD GRADUATE STUDIES RESEARCH CTR.
ATHENS, GA 30602

Security class (U,C,S,TS) : U ONR resident rep. is ACO (Y/N): N
Defense priority rating : NA NA supplemental sheet
Equipment title vests with: Sponsor GIT X
*SEE "GENERAL PROJECT TERMS & CONDITIONS" FOR DETAILS GOVERNING PURCHASE.
Administrative comments -
ADMIN MOD TO CHANGE PROJECT # FROM B-793/EOEML TO B-13-604/OIP.
*CHANGE ALL RECORDS TO REFLECT "NEW" PROJECT #.***

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Closeout Notice Date 07/11/95

Project No. B-13-604 Center No. 10/24-6-Q6323-0A0

Project Director BAYER C W School/Lab EOEML

Sponsor UNIVERSITY OF GEORGIA/ATHENS, GA

Contract/Grant No. GETC95.301-GIT Contract Entity GIT

Prime Contract No. GETC95.301

Title INDOOR AIR QUALITY, GETC 95-301 - GIT

Effective Completion Date 950630 (Performance) 950630 (Reports)

Closeout Actions Required:	Y/N	Date Submitted
Final Invoice or Copy of Final Invoice	Y	
Final Report of Inventions and/or Subcontracts	N	
Government Property Inventory & Related Certificate	N	
Classified Material Certificate	N	
Release and Assignment	N	
Other	N	

Comments

Subproject Under Main Project No.

Continues Project No.

Distribution Required:

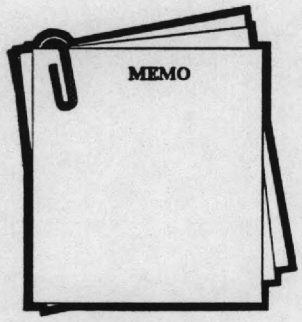
Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Managment	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	Y
Project File	Y
Other	N
	N

~~B-793~~ B-13-604
1

Georgia Tech Research Institute
Electro-Optics, Environment & Materials Laboratory
Environmental Monitoring Branch
Emerson A-112

Phone: 404-894-3825
Fax: 404-853-0113

MEMORANDUM



TO: GETC

THRU: Office of Contract Administration

FROM: Charlene Bayer

DATE: October 25, 1994

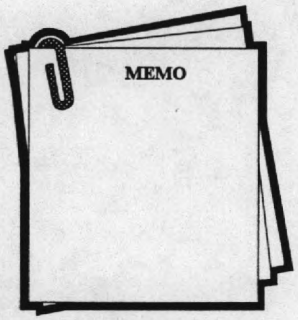
SUBJECT: Quarterly Financial Report

No money has been spent.

Georgia Tech Research Institute
Electro-Optics, Environment & Materials Laboratory
Environmental Monitoring Branch
Emerson A-112

Phone: 404-894-3825
Fax: 404-853-0113

MEMORANDUM



TO: GETC

FROM: Charlene Bayer

DATE: January 3, 1995

SUBJECT: Quarterly Financial Report for GRA Instrument Funds

The following purchases has been requested through the GTRI/OIP office of Georgia Tech:

1.	Environics gas blending system	$ 39,470
2.	ISCO HPLC	$ 14,866
3.	Viking GC/MS	$156,120
4.	Particle beam LC/MS	$147,582
TOTAL REQUESTED TO BE SPENT		$358,038

No instruments have been received to date.

A. PROJECT IDENTIFICATION

GRA Project Number: GETC94.09 Funding Year: 1994

Project Title: The Role of Fungal Contamination, Building Colonization, and the Production of Volatile Organic Compounds by Fungi Indoors

Project Director: Charlene W. Bayer, Ph.D.
Institution: Georgia Institute of Technology
Address: Electro-Optics, Environment, and Materials Laboratory
Georgia Tech Research Institute
Emerson A112 Mail Code: 0820
Atlanta, Georgia 30332-0820
Phone Number: 404-894-3825

Project Collaborator: Sidney Crow, Ph.D.
Institution: Georgia State University
Address: Environmental & Applied Microbiology Research Group
Department of Biology
Georgia State University
PO Box 4010
Atlanta, Georgia 30302-4010
Phone Number: 404-651-2509

Project Collaborator: Howard Frumkin, MD, MPH
Institution: Emory University
Address: Emory School of Public Health
Division of Environmental & Occupational Health
1599 Clifton Road, NE
Atlanta, Georgia 30329
Phone Number: 404-727-3697

B. PROJECT SUMMARY

Objective:

A first step to understanding many indoor air quality problems, particularly in the Southeast, is the determination of the types and densities of fungi in buildings; detecting these fungi prior to their impacting structures and human health; and understanding the capacity of these indoor fungi to induce infection and/or allergenic and neurological disease. This research project initiated the research into these and other indoor air quality problems, by initiating research into fungi types and densities and using volatile emissions from the fungi as potential markers for the presence and growth of fungi.

Progress:

Progress has continued this year. We have been working several school systems in the State of Georgia on severe indoor air quality problems, ones which have had detrimental health impacts to the students and staff. In each case, the health impacts have been a result of fungi growth in the ventilation systems. The fungi contamination has resulted because of poor design of the school ventilation systems. We believe, because of the similarities of the problems, that this represents a serious problem for the State, and requires further study, as well as better education of the staff of the state school systems. We have also conducted similar studies in various office buildings in Georgia, helping Georgia employers to solve difficult problems that might have resulted in significant lawsuits. The findings in these building is continuing the work to look for fungal volatile markers to determine the presence of fungal contamination in buildings, before occupant health has been impacted.

We have initiated studies into understanding fungal volatile emissions from fungi growing on fiberglass insulation. We are seeking outside funding to look at these further. Several papers are in process to report on the work to date. This work is being performed with the FLEC and ion trap mass spectrometer that were purchased with the grant.

Work is continuing on the multiyear project funding under a Cooperative Agreement with EPA to characterize particle and aerosol emissions from consumer aerosol products. The Sciex API III MS/MS is being used for this project. This work will not only benefit the consumer aerosol industry, but is applicable also to the fungal volatiles research, since the fungal spores are aerosolized into the indoor environment.

The newest direction for this research is proposed development of a biomimetric sensor to understand toxic and allergenic responses to fungi and fungal volatiles in indoor environments. Research proposals have been submitted to seek funding for this effort.

In addition the instrumentation has been used for numerous projects that help industry that is not specifically related to fungal volatiles research, such as recyclable products research for The Coca-Cola Company, and emissions from coatings products for the Troy Chemical Corporation and 3M Corporation. It is also being used for research with Ciba-Geigy Corporation and Chemtronics.

Collaboration:

A strong working relationship has been established between the three collaborating unversities. Additionally collaborations are being established with the Medical College of Georgia. The collaboration between GT and GSU is particularly strong. These two groups are working almost seamlessly. This collaboration is essential for the growth of the programs. The GT, EU, GSU collaboration is expanding beyond the individual collaborators. The biomimetric sensors are a good example of this.

Results:

Several elementary schools in the State of Georgia are contaminated with airborne and surface fungi in the ventilation systems. This fungal growth has resulted in rashes and respiratory problems in both children and staff in the contaminated areas. In two instances, classrooms have had to be vacated because the health problems are so severe. In each of the cases, the fungal contamination resulted from poor design of the school ventilation system. This has been very interesting since the school systems range across the state, the symptoms are very similar, and the findings are very similar. This has led us to believe that a state-wide effort needs to be undertaken to broadly look at this problem, prior to student and staff illnesses.

A prototype new air cleaner media, that does not suppport microbial growth, was developed last year. A proposal has been submitted with the Chelsea Group, a commercial firm, for combination of this media with a product developed by Chelsea Group and commercialization. The proposal has been submitted to NIST under a Advanced Technology Development Program.

We have found that fiberglass insulation, even unused fiberglass insulation, will support microbial growth and release fungal volatiles into the air. We have also found that many of the fungal volatile emissions from fiberglass and other nutrient bases, are solvent type compounds. This is particularly important since usually these presence of these solvent-type compounds is blamed on product manufacturers, such as the carpet manufacturers. When this happens, these manufacturers are asked to modify their products unnecessarily. As our understanding grows of the fungal volatile emissions, then product manufacturers will better be able to produce products that are friendly to the indoor environment.

C. NUMERICAL MEASURES

This project has resulted several contracts and grants and numerous proposals over the past year:

Awarded Grants and Contracts

Project Title	Source of Support	Funding	Award Period
Environmental Analytical Services Laboratory	Various Industrial & Governmental Sponsors	$170,000	Continuous
Application of Pollution Prevention Techniques to Consumer Aerosol Products	US EPA	$303,000	1993 - 1996

Development of Methodologies for Measurement of Emissions Formaldehyde and VOCs from Commercial Coating Products & Biocides	Troy Chemical Company	$90,000	1993-1995
Development of Methodologies for Determination of Isocyanate and Ester Emissions from Coating Products	3M Research Corporation	$20,000	1995-1996
Development of Methodologies to Determine Stack Emissions from Textile Plants	State of Georgia	$9,000	1995
Determination of Residuals in PET Bottles prior to Recycling	The Coca-Cola Company	$200,000	1995-1996
Emissions from Building Materials made from Recycled Carpet Products (Pending)	Shaw Industries	$300,000	1995-1998
Development of Biofiltration Air Cleaner (pending)	ASHRAE	$50,000	1995-1996
Laser Desorption of Consumer Aerosol Products (pending)	US EPA	$450,000	1996-1999
Development of a Biomimetric Sensor for Irritants & Toxicants Indoor Environments (pending)	US EPA	$450,000	1996-1999
Development of Methodologies to Measure Stack Emissions fro Textile Mills (pending)	State of Georgia	$20,000	1995-1996
Development of Catalytic/Hydrogel Air Cleaner (pending)	NIST	$750,000	1996-1998
Development of a Biomimetric Sensor for Asthma Reactions in the Indoor Environment (pending)	Center for Indoor Research	$600,000	1996-1999
Evaluation of Sensors for Response to Freons (pending)	Yokogawa Corporation	$169,000	1996

Project Title	Support	Source of Funding	Award Period
Evaluation of fungal strains in the bioremediation of chlorinated hydro-carbons	WSRC	$81,286	1994-1996
Microbial Ecology of the Indoor Environment (pending)	NSF	$870,490	1995-2000
Purchase of Multi-user Imaging Equipment (pending)	NSF	$463,722	1995-1995
Microbial Ecology in Energy Efficient Buildings (pending)	EPA	$306,686	1995-1997
Intermittent odors alledgedly coming out of AC and heat pumps (pending)	ARI	$38,712	1995-1995

D. FINANCIAL DISCLOSURE

1.	Sciex API III LC/MS/MS	$382,653	in service March 1994
2.	Hewlett-Packard Supercritical Extractor	$ 50,427	in service March 1994
3.	Varian Saturn III GC/MS	$50,000	in service Janurary 1994
4.	FLEC	$8735	in service October 1994
5.	Dell Omiplex Pentium Computer	$5,674	in service July 1994
6.	Hewlett-Packard 3396B	$2,335	in service August 1994
7.	HP ScanJet IICX Scanner	$801	in service August 1994
8.	12-Stream Valve	$575	in service February 1995
9.	ISCO HPLC	$16,699	in service August 1994
10.	EZ Chrom Software	$3,495	in service November 1994

E. INDUSTRY PARTICIPATION

Numerous industry partners participate in various aspects of this research. Several are listed above. Major technological advances are helping industry to produce more environmentally friendly products and to prevent unfair or unnecessary regulation.

B-13-604 #4

A. PROJECT IDENTIFICATION

GRA Project Number: GETC95.301 Funding Year: 1995

Project Title: Indoor Air Quality

Project Director: Sidney Crow, Ph.D.
Institution: Georgia State University
Address: Environmental & Applied Microbiology Research Group
Department of Biology
Georgia State University
PO Box 4010
Atlanta, Georgia 30302-4010
Phone Number: 404-651-2509

Project Collaborator: Charlene W. Bayer, Ph.D.
Institution: Georgia Institute of Technology
Address: Electro-Optics, Environment, and Materials Laboratory
Georgia Tech Research Institute
Emerson A112 Mail Code: 0820
Atlanta, Georgia 30332-0820
Phone Number: 404-894-3825

Project Collaborator: Howard Frumkin, MD, MPH
Institution: Emory University
Address: Emory School of Public Health
Division of Environmental & Occupational Health
1599 Clifton Road, NE
Atlanta, Georgia 30329
Phone Number: 404-727-3697

B. PROJECT SUMMARY

Objective:

The objective of this reseach initiative is the development of an understanding of the impact of indoor air quality on human health and its effect on building stock structural degradation. The primary components include the examination of buildings and developing methodologies for field sampling.

Progress:

Field sampling in buildings increased this year putting a significant focus on improving field sampling methodologies, particularly for on-site analysis. An excellent example of this, is being used in the CCATI project. Georgia industries must have Clean Air permits prepared by November 1995. Many industries are not able to prepare these permits, because they have no way to know what their emissions are. The Georgia textile mills are an example of this problem. Using the portable GC/MS purchased under this grant, on-site analysis of emissions emanating at the plant are being determined. This will allow the mills to prepare Clean Air permits in a manner that will minimize the impact on the industry.

We have been working several school systems in the State of Georgia on severe indoor air quality problems, ones which have had detrimental health impacts to the students and staff. In each case, the health impacts have been a result of fungi growth in the ventilation systems. The fungi contamination has resulted because of poor design of the school ventilation systems. We believe, because of the similarities of the problems, that this represents a serious problem for the State, and requires further study, as well as better education of the staff of the state school systems. We have also conducted similar studies in various office buildings in Georgia, helping Georgia employers to solve difficult problems that might have resulted in significant lawsuits. In each of these cases, improved field sampling methods greatly increase the ability to accurately determine the source of the problems, and to respond to the complaints in a timely manner.

We have been using the field sampling technology in the environmental chamber facility to help various industries prepare lower emitting products or understand their products sufficiently to meet potential regulatory requirements. We have been particularly active in developing methodologies for coatings products for Troy Chemical Corporation and 3M Corporation.

The newest direction for this research is proposed development of a biomimetric sensor to understand toxic and allergenic responses to fungi and fungal volatiles in indoor environments. Research proposals have been submitted to seek funding for this effort. Proposals are also out for the development of a biomimetric sensor that will mimic the human response to contaminants that result in an asthmatic response. These sensors will aid in understanding the human response that results in asthma and help to answer the question of why childhood asthma is on the rise.

In addition the instrumentation has been used for numerous projects that help industry that is not specifically related to indoor air quality research, such as recyclable products research for The Coca-Cola Company. It is also being used for research with Ciba-Geigy Corporation and Chemtronics.

Collaboration:

A strong working relationship has been established between the three collaborating unversities. Additionally collaborations are being established with the Medical College of Georgia. The collaboration between GT and GSU is particularly strong. These two groups are working almost seamlessly. This collaboration is essential for the growth of the programs. The GT, EU, GSU collaboration is expanding beyond the individual collaborators. The biomimetric sensors are a good example of this.

Results:

Several elementary schools in the State of Georgia are contaminated with airborne and surface fungi in the ventilation systems. This fungal growth has resulted in rashes and respiratory problems in both children and staff in the contaminated areas. In two instances, classrooms have had to be vacated because the health problems are so severe. In each of the cases, the fungal contamination resulted from poor design of the school ventilation system. This has been very interesting since the school systems range across the state, the symptoms are very similar, and the findings are very similar. This has led us to believe that a state-wide effort needs to be undertaken to broadly look at this problem, prior to student and staff illnesses.

A prototype new air cleaner media to remove particulate and gaseous contaminants from air was developed last year. A proposal has been submitted with the Chelsea Group, a commercial firm, for combination of this media with a product developed by Chelsea Group and commercialization. The proposal has been submitted to NIST under a Advanced Technology Development Program. The biggest advantage to an air cleaner such as this, is that cleaner air could be supplied to occupied zones, improving human health, while saving energy.

We have been able to determine interesting results on the CCATI work done to date. The emissions from the plant appear to be very similar whether or not the plant is acutally manufacturing product or is shutdown.

C. NUMERICAL MEASURES

This project has resulted several contracts and grants and numerous proposals over the past year:

Awarded Grants and Contracts

Project Title	Source of Support	Funding	Award Period
Environmental Analytical Services Laboratory	Various Industrial & Governmental	$170,000	Continuous

	Sponsors		
Application of Pollution Prevention Techniques to Consumer Aerosol Products	US EPA	$303,000	1993 - 1996
Development of Methodologies for Measurement of Emissions Formaldehyde and VOCs from Commercial Coating Products & Biocides	Troy Chemical Company	$90,000	1993-1995
Development of Methodologies for Determination of Isocyanate and Ester Emissions from Coating Products	3M Research Corporation	$20,000	1995-1996
Development of Methodologies to Determine Stack Emissions from Textile Plants	State of Georgia	$9,000	1995
Determination of Residuals in PET Bottles prior to Recycling	The Coca-Cola Company	$200,000	1995-1996
Emissions from Building Materials made from Recycled Carpet Products (Pending)	Shaw Industries	$300,000	1995-1998
Development of Biofiltration Air Cleaner (pending)	ASHRAE	$50,000	1995-1996
Laser Desorption of Consumer Aerosol Products (pending)	US EPA	$450,000	1996-1999
Development of a Biomimetric Sensor for Irritants & Toxicants Indoor Environments (pending)	US EPA	$450,000	1996-1999
Development of Methodologies to Measure Stack Emissions fro Textile Mills (pending)	State of Georgia	$20,000	1995-1996
Development of Catalytic/Hydrogel Air Cleaner (pending)	NIST	$750,000	1996-1998
Development of a Biomimetric Sensor for Asthma Reactions in the Indoor Environment	Center for Indoor Research	$600,000	1996-1999

(pending)

Evaluation of Sensors for Response to Freons (pending)	Yokogawa Corporation	$169,000	1996

Project Title	Support	Source of Funding	Award Period
Evaluation of fungal strains in the bioremediation of chlorinated hydro-carbons	WSRC	$81,286	1994-1996
Microbial Ecology of the Indoor Environment (pending)	NSF	$870,490	1995-2000
Purchase of Multi-user Imaging Equipment (pending)	NSF	$463,722	1995-1995
Microbial Ecology in Energy Efficient Buildings (pending)	EPA	$306,686	1995-1997
Intermittent odors alledgedly coming out of AC and heat pumps (pending)	ARI	$38,712	1995-1995

D. FINANCIAL DISCLOSURE

1.	ISCO HPLC	$15,649	in service May 1995
2.	Environics Gas Blending System	$39,564	in service February 1995
3.	Viking Spectra Track GC/MS	$156,605	in service May 1995
4.	Particle Beam LC/MS	$143,525	in service June 1995
5.	FLEC	$12,875	not yet received
6.	B&K Photoacoustical Monitor	$80,000	in service August 1994
7.	2 Multiport Sampling System	$8,863	not yet received
8.	Canon Rebel Camera	$791	in service May 1995
9.	Scanning Fluorescence Detector	$6,873	not yet received
10.	5 Personal Air Sampler	$2,635	in service June 1995
11.	FLEC Air Pump	$1,800	not yet received
12.	Trakker Tape Drive	$284	in service June 1995
13.	CD Rom Reader	$399	not yet in service
14.	Harvard Graphics Upgrade	$85	not yet received

E. INDUSTRY PARTICIPATION

Numerous industry partners participate in various aspects of this research. Several are listed above. Major technological advances are helping industry to produce more environmentally friendly products and to prevent unfair or unnecessary regulation.